

**ASSESSMENT OF ELECTRICAL ENERGY USE EFFICIENCY
IN SELECTED FOOD COMPANIES IN SOUTHWESTERN
NIGERIA**

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ABSTRACT

This study examined various patterns of energy consumption, sources of energy waste, and assessed the effectiveness of the strategies that were employed to reduce energy waste in food industry in Southwestern Nigeria. This was with a view to recommending policy measures that would enhance effective and efficient electrical energy utilization in the food companies.

Purposive sampling technique was used to select 210 companies in Southwestern Nigeria from a population size of 303 Small and Medium Enterprises (SMEs) in Food, Beverage and Tobacco sector that were recorded in Central Bank of Nigeria Small and Medium Industries Nigeria's Information System of 2004. These were made up of 18, 90, 24, 18, 12 and 48 food companies in Ekiti, Lagos, Ogun, Ondo, Osun and Oyo States, respectively. The questionnaires were administered to factory owners, factory engineers, production managers and workers within the production unit. Some utility managers were also picked at random for oral interview. The research instruments elicited information on the pattern of energy consumption, sources of energy waste and methods employed to reduce the wastages, among others. Descriptive statistics was employed for the data analysis.

The study revealed that 89.7% of the industry used standby generating sets as an alternative to mains supply. It also revealed that 48.3% of the enterprises were into beverage production, 37.9% bakery and confectionery production, 7.0% grain milling, 3.4% cold food enterprises and 3.4% sachet water production. Specifically, the study revealed that the most prominent sources of energy waste in the food industry were wear on machine gear teeth (82.8%), worn out pulleys (70.4%), and air leakage from ovens, refrigerators and other drying and cooling equipment (66.7%). Other sources of energy waste and loss that were less prominent included among others, slacks or worn out belts, undersized main supply cable and lubrication failure in gear boxes. The study further

showed that the following strategies had major influence on the energy use efficiency of the selected food companies in the study area: rationing between electricity and generating plant (36.4%), bulk production (6.1%), and preventive maintenance (3.0%). Other important factors that influenced the efficient utilization of energy in the food companies were equipment power factor (62.5%), lighting systems (6.1%), sized cable (3.0%), and supplied voltage (62.5%).

It is concluded that supply of appropriate voltage from the mains, procurement of new electrical equipment with high power factor and (or) power factor improvement on the existing ones, among others, could enhance electrical energy use efficiency in the food industry in the study area.